Good afternoon. We're going to start our next session, and we're pleased to have Analog Devices for our next session, and we're pleased to have Vincent Roche, CEO and the Chairman of the Board of Directors. So thank you, Vincent.

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Thank you, Tim, for having me.

QUESTIONS AND ANSWERS

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Great. Well, let's just start. You reported 2 weeks ago now and business deteriorated a bit more than you expected at that time or than you thought 3 months prior. But your lead times have also fully normalized and bookings were actually up sequentially, which I take as an optimistic sign. Can you just talk about the overall demand environment and maybe some of your more important end markets? And what was particularly worse than you expected it to be 3 months ago?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Yes. So I think what you said is correct that our bookings got back to a more normal pattern, lead times, of course, are back to normal, more than 95% of our products now are shipping with 13-week or there about lead times. So I think that gives customers the opportunity to decrease the amount of inventory they hold on their balance sheets. They see normality being restored.

So in terms of -- and cancellations were way, way down. In terms of what performed more weakly than we had expected, is really the industrial sector. And the industrial sector for ADI, it's 50% of ADI's business and it has 4 major pieces to it. It's got factory automation, instrumentation, aerospace and defense and digital health care. And it was really the factory automation part of that, that performed at a rate that was a bit of a surprise to us. But within that, you had to look again at which part, and it was really, I'd say, the -- it's a business characterized by tens of thousands of customers. And it was really the small- and medium-sized enterprises that suffered most and I think a lot of that is attributable to the rising interest rates, the cost of capital. And generally speaking, our customers turning towards the end of the year with this new interest rate environment, just protecting working capital, essentially.

And as you look at autos, for example. How do you see that end market? It's been holding up a bit better than I think some of us had thought that it might. So can you just -- can you talk about that? Do you think it's a crack that just has -- it's a market that has yet to crack or you're optimistic that maybe it might not crack?
Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Look, it’s been a business that has been using more and more of the electronics that we build for our in-cabin experience, for the electrification of the vehicles, with battery management systems, safety systems and power management. So it’s quite a diversified business for ADI. And I would say there are kind of 2 parts of the portfolio.

The newer electronics for BMS for things like multi-bit serial links, giga-bit serial links. Those things have been increasingly been gaining momentum. These are newer products, a lot of new activity. And they’ve kept a pretty brisk rate of growth. Where we see more, I would say, normalization of consumption are in the kind of the older products, the more established applications that are not growing as fast.

But when I look into ’24, I still think automotive will be perhaps the strongest segment for ADI. We’re seeing -- in general, what we’re seeing in automotive is 10% to 15% more silicon used in each new car platform. I believe that will be the case to the end of -- at least the end of the decade. And we’re benefitting from more sensors being used in cars. The electrification I’ve mentioned, the battery management systems, and we have 2 modalities there, both the more established wired technologies, but we’re now at the early inception of our wireless technologies as well. And I think that creates a whole new growth trend for ADI.

We have 5 major OEMs signed up for that technology, which is yet really to deploy. So yes, I’m optimistic about automotive for ’24. Of course, the big governor is what happens the SAAR. But even if SAAR moderates or declined somewhat, we still believe we’ll be able to hold our position.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And how about pricing? It’s actually held up pretty well, better than what I think some of us felt that it would have. Why when you sort of go back and you sort of deconstruct, why is it held up better? Is it just the fact that foundry pricing hasn’t come down. And so as you’re passing on foundry pricing, maybe if it comes down, that’s when pricing comes down? Or is there something bigger at work where you think that the price increases have staying power or the pricing itself has?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, even pre-pandemic. We have a franchise that’s based on basically more than 100,000 customers, 75,000 product SKUs. And we’re never the most sensitive element in a customer’s system when it comes to pricing. So typically, when we get a design established -- in the industrial business, those sockets will last for 17 years on average. And then consumer is somewhere between 3 and 5 years. But when we get the socket, when we get the design, the pricing is very, very steady over the life of the product.

So these are very sticky products. Many, many places in which we play. So there’s a tremendous diversification of applications. But the prices that we installed, the increases that we put on our customers during ’21 and ’22, they will stick largely. And if there are more price increases in the future, we will simply pass back on the cost of goods, essentially.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

So is it such that throughout the life -- so price gets negotiated at the time of the design in. Throughout the life of that design, I’m sure that customers come and say, I want a lower price because business is worse, and I’m selling fewer widgets than I thought I was going to sell, do you grant price concessions versus where the price was originally? Or is there some schedule built in upfront?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, it depends, yes. I think typically, if there are price decreases in the portfolio over time, that has agreed upfront. And it tends to be based upon -- it’s a volume to price relationship. So if the volume occurs that we’ve agreed upfront and there’s a certain price reduction associated with that,
then we honor that obviously. But there are parts of the portfolio as well, where we actually increase prices, we inflate prices overtime, typically older vintages that we maintain for 20, 30, 40 years. So it’s -- the pricing story has 2 very different dynamics to it.

**Timothy Michael Arcuri** - *UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment*

Yes. I guess what I’m getting at is that it sounds like there really isn’t a reason for you to give price concessions nor is there a reason to believe that price will go down other than the fact that your foundry prices go down and you can pass that?

**Vincent T. Roche** - *Analog Devices, Inc. - CEO & Chair of the Board of Directors*

Correct.

**Timothy Michael Arcuri** - *UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment*

Can we talk about China? I mean, we could spend the next 20 minutes talking about China, which I’m sure that most of your meetings were -- most of the questions were about China. But we tore down the BYD EV and we've done 2 of these teardowns, and people were, I think, surprised to see that BYD did their own BMS. Can you talk not about BYD in particular, but can you talk just about how exposed do you feel in China to local China competition?

**Vincent T. Roche** - *Analog Devices, Inc. - CEO & Chair of the Board of Directors*

Yes. Well look at -- our business in China is distributed over several tens of thousands of customers. Again, we deployed many thousands, many tens of thousands of product SKUs. And again, once we get the design ins established, those products tend to last. We have a sole source portfolio. We have very little substitution of our portfolio once the products are in life. And yes, there is no question that there is an uprise in the digitization program in China. But ADI plays at the highest end of the performance spectrum, whether it’s industrial, whether it’s automotive, health care, communications. And as long as there is a market for high-performance technology, ADI will be the first choice.

So yes, I believe there will be a continuing activity to displace foreign suppliers in China. But at the end of the day, as I said, I believe, as we're seeing today, actually, if you look at our opportunity pipeline, which is the best leading indicator for what might happen in the future, that pipeline is increasing in size. So we have sticky products, many tens of thousands. And yes, there will be -- I think, places in the vertical market where the BYDs will be perhaps capable of building their own technologies. But again, I don’t expect that ADI will be displaced at the high end of that game.

**Timothy Michael Arcuri** - *UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment*

It seems to be -- I mean, there are a couple of constellations, as I call them in China, 1 being Huawei and 1 being BYD. And so those are kind of unique examples. So it seems to me like that’s a unique -- I don’t want to call it a one-off, but it seems to me like that’s just a unique situation where there’s a constellation of semiconductor suppliers and capabilities such that they could do something like that.

**Vincent T. Roche** - *Analog Devices, Inc. - CEO & Chair of the Board of Directors*

Yes. I think as well, it takes a certain amount of scale to be able to verticalize your business, to build your own silicon or at least design your own silicon, have it built. But the majority of our customers in areas like China are small and medium-sized and I believe that will be a merchant market for the long term.
Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And do you -- I mean, even within China, do you feel that the -- I mean, there's a dynamic of, okay, there's a local Chinese supplier that is coming in with a part that is cheaper than yours and maybe it's a lower end part. And so the customer is going to go with whoever has the lowest price. But then you hear someone like [Adaptive] is out on a public call after, just talking about qualifying a bunch of Chinese suppliers. And I get 50 e-mails from people that just amps up all the concerns about China.

Do you think that there is going to be a content requirement that will, to some degree, protect you? Or -- because that's what I thought until I heard the Adaptive comments and then I was thinking, well, geez, maybe it just is really all about price and cost, that's it. So how did you hear the Adaptive comments and were you surprised to hear what they said?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, look, I think there are really 2 markets in the analog space. There's the commodity market, which is the lion's share of the revenue pool and then there's the high-performance part of which we have a very significant share as a company. And I don't believe, by the way, that this is a black and white situation where you will have displacement. You'll have Chinese suppliers, Japanese, whatever it is, in any part of the world, any region where you'll see complete displacement of one particular legacy sector replaced by another sector.

I think you'll see a mix change. There will be parts of the business that are perhaps more commodity, less performance-driven where costs will matter more. But we as a company, our whole value -- our whole proposition is based on building and selling value. And I think that gives us a moat, a defensive moat to some extent, to a large extent. And we keep getting better at playing that game each and every year.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

You've been through a lot of these cycles and seen a lot of things. And what are you taking forward from what happened during this past cycle? And how -- I mean, obviously, it took longer for things to crack for some of the analog companies because things got so tight and there was LTAs and there were things that just pushed out an inevitable cycle. But there were other dynamics about the cycle that are truly seem to be maybe structurally different going forward. So what did you learn about this cycle that you'll take forward to make ADI a better company going forward?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, I think every cycle has the same output. You're either under -- overshooting or undershooting but the inputs tend to be different. I mean this was a very, very unusual situation in the sense that in 2020, we had a supply chain fracture. And in '21, we were all expected to ship essentially 16 months worth of goods in 12 months. But I think we learned that our hybrid model was tremendously valuable to ADI during the cycle. And if we ever had any designs to kind of build everything internally, we give up -- if we ever had that, we give up that cost because it helped us enormously to have -- when the supply was very, very short, the partners who could help us build the supply line that we needed. Also -- so I think carrying that forward with us is really, really important.

I think in general, we all learned that the resilience of the analog supply chain was seriously questioned because of lack of investment over many, many years. So we invested some of our own capital to build up certain parts of our semiconductor manufacturing capability, particularly on the front end at 180 nanometers and above but also on the back end. So we've accelerated investments to capture what we believe will be a very brisk growth cycle moving ahead.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And do you feel -- I mean, certainly, for smaller nodes, you have foundry relationships. How quickly if you decide -- you have a competitor who's saying, I'm going to be as vertically integrated as I can be. But it works to have partnerships if a foundry can be very flexible and can provide you
what you need in a fairly short amount of time. How did you manage that during the upturn because you didn’t have as many shortages as a company, for example, who had right their own manufacturing. So how did you manage that with your foundry partners?

**Vincent T. Roche** - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, going into 2020, 2021, we had agreements upfront as to what the outlook was for capacity need from each of our key suppliers on the silicon side of things. And as demand was modulated above those forecasts, our partners were able to supply us. So that flexibility -- our factories were full internally. But having that extra capacity and that flexibility outside was tremendously important.

As I said, if there was ever a notion that we were going to verticalize and build everything inside during the pandemic, we saw the power of a hybrid model and the flexibility. And then on the downside, when demand dampens, we're able to make sure that we keep the utilization factors in our factories at high levels to protect our cost structures and our margins.

**Timothy Michael Arcuri** - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Also, can you talk about how proactive you've been about managing down channel. You've been a bit more proactive than your years have been. Obviously, your year-over-year comps are the worst among your peers right now. But that's -- to me, that's simply the result of the fact that your comps were so high in the upturn because others didn't have supply and you did. So it -- just is math really. And so you should have a better inflection of the bottom, but you've also been more actively or more proactive in terms of working down channels. So that's also another factor that should help you off the bottom.

**Vincent T. Roche** - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Exactly. We know that we're undershipping our largest customers. The analysis shows us that we're shipping it at a rate that's below their sell-through. And we run ADI on a POS signal. So we pay very close attention to what's happening at the -- in terms of sell-through. We don't look at sell-in. That's a piece, but that's a second order of derivative. So we're looking very clearly at what's selling through. We set up our factory, the factory outputs based on what we believe the POS signal is telling us. And we also have not, in any way, we're keeping the channel lean. We're keeping more inventory on our balance sheet, keeping the channel lean. And I think all that gives us the opportunity when the cycle inverts here and we start to see growth again, we get more control over where the goods are moving to big customers and small customers and that we manage effectively what we believe to be the true needs based on POS.

**Timothy Michael Arcuri** - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

So as much -- this is a difficult question to answer, I'm sure. But in as much as you can tell, how much do you think you're undershipping demand to -- just in aggregate -- consumption, I mean.

**Vincent T. Roche** - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Yes. It's probably -- right now, it's probably in the region of 15%, 20%.

**Timothy Michael Arcuri** - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

That much. Okay. And obviously, it will take a while for that to come back because you have to normalize inventories and right, channel has to come back. Got it. Can we just talk about turns? So typically, I think you need about 15% of turns in a given quarter, you're not back to that level yet. If turns -- it sounds to me like if turns return to normal, that would be upside to what you're guiding for Q4 and your outlook into Q1. So you're not really counting on turns coming back. Is that correct?
Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Yes. Well, bookings are improving, but we’re still -- we still got pretty healthy backlog in the short term. And when the recovery happens, we’re going to see turns, that will be one of the indicators that we’re getting back onto a solid growth path, again, turns will improve fairly dramatically, I think.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Let’s talk about Maxim revenue series. Where do you stand relative to that $1 billion target? I think the target is by 2027 is the target. It sounds to me like you could get there faster than that. Can you just walk through that?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Yes. So what we’re seeing is in terms of revenue synergies, I’d say, what we’re seeing is great strength in automotive. We’re seeing an uptick in our data center business. And in areas like clinical grade wearables in the health care space, for example.

So we’re optimistic based on what we’re seeing in terms of design-ins. We’re beginning to see serious revenue begin, particularly in the automotive sector, areas like GMSL, power management, for example. So my sense is the $1 billion target that we’ve set for ’27, we will do. I mean the big governor in all this, of course, is what happens in the macro economy. But one thing I’m sure about is that the consumption of semiconductors in general will continue to grow at a brisk pace, I think over this coming decade, given the importance of semiconductors to our social lives and our economic lives. So whatever happens in the short term, I’m still optimistic that we will get that $1 billion revenue target in the bag by ’27.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

I guess it depends on how quickly these products ramp, these design wins ramp, you’re only -- you can only control the wins, you control how quickly things ramp. But could -- I mean is it conceivable that you could get half of that by fiscal ’25? Like is that a conceivable number?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

It’s possible. It’s possible.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And what’s -- is there an end market where you feel that out of all your key end markets, what’s the biggest piece of that $1 billion?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Automotive. Automotive, it’s everywhere. It’s in cabin. I mean it’s the GMSL, media -- the transport systems, power management, the electrification of the vehicle, the battery or the battery stuff there. And then there’s a lot of established analog electronics that support those functions that I just mentioned. So it’s right through essentially the whole spectrum of cars from combustion engines through electric vehicles. So we don’t participate in the combustion engine electronics itself.
Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Yes. I mean what really sets you apart is just the sheer diversification of your end markets. And you have the most exposure, I would say, to true industrial and well, industrial end markets, as you said before.

When you guide where to invest money, I mean, obviously, you’re going to invest in automotive. We’ve talked about that. But within industrial, where do you guide your R&D dollars?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

We see big opportunities. So industrial, it tends to be the first call on the R&D. And that business has 4 major components, factory automation, aerospace and defense, digital health care and instrumentation. And we see a big opportunity in factory automation. The -- for example, the conversion of factory systems and that conversion between OT and IT. We have a big play there in terms of the connectivity solutions.

The Edge fabrics, the software-defined input output systems. So that’s a significant opportunity. Industry 4.0, Gigafactories, big, big opportunity for ADI. So we’re investing heavily in that, bringing intelligence, robotics, automation systems as well.

Aerospace and defense, it’s probably the only area right now where we are seeing supply constraints. And we do a lot of our high-speed technology development specifically for that sector. So we’re doubling down on that. So that encompasses a lot of microwave technology, very, very high bandwidth data conversion systems.

So generally speaking, I would say, digital health care is another area. We’re seeing an upsurge in the need for our newer instrumentation, automatic test equipment, solutions for things like AGI and the build-out of the new versions, the new generations of data centers that need to be built to handle AGI.

So I mean that’s -- those are some of the vectors that we're investing in, in the industrial space. Obviously, automotive is the next in terms of a bucket of opportunities into which we’re putting a lot of R&D capital as well for all the things we just talked about.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And has it put -- I mean, with a little bit more than 70% of your revenue coming on 180-nanometer and above, in the past, there was a pretty steady stream of used tools where you could have a very good -- very, very low capital intensity because of that influx. That really has -- it’s not fully gone away, but it’s not -- it’s not as robust as it used to be, right? So yet you are really cutting CapEx quite a bit. But how do you think about the pressures that, that puts on the model going forward? Is that a factor to consider? Or is it just not that big of a deal?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Well, let me give you a couple of specifics. So by the middle of ’25, we will have more than double the internal factory capacity. And we’ve been able to do that for approximately $1.5 billion, $1.6 billion. We are spending another $600 million, $700 million to upgrade our capabilities in Asia, pretty much the test capabilities. We do very little assembly inside ADI. And so basically for $2.25 billion, we will have more than double the output of ADI’s factories. That’s the nature of the analog business. And these assets, we’ll be using in 30, 40 years’ time. So it’s a really different economic proposition to building fabs to handle 3-nanometer digital technology.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And you still feel when you laid out the financial model, you had a $15 earnings number, you still -- I mean, things have changed a lot. So it’s a longer way to get there from where you are now. But I mean, is that still in the cards?
Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

I think it’s reasonable. That’s predicated on being able to grow this business 7% to 10% per year. As I said, I think ‘24 could be a tough year. But I think ‘25 and beyond, we’ll get back into a more normal growth pattern. So I still feel comfortable with all the growth vectors that we have. As tailwinds in the business. It used to be that you get 1 tailwind at a time.

In the early ‘90s, it was digitalization of media, PCs. Early 2000s, it was the Internet. But now we have -- we’re digitalizing every part of physics, biology and chemistry. And we’ve got all these secular tailwinds, Industry 4.0 digitalization of health care. The transition to electrification of the transportation system. All these different things are concurring and giving us a stronger tailwind in the business than we’ve ever had in our history.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

And just as a last question, having been through these cycles before. What is the most important KPI that would make you more optimistic about the business? Because to me, having covered these businesses for a long time, it’s like bookings are everything. I mean when bookings start to turn around, that’s the single most important KPI. And they actually have. I mean, (inaudible) bottom, now they’ve been quite low. But the fact that they’re getting better ought to make you more optimistic, yet you still sound somewhat cautious about next year. So I’m just trying to -- is there a better KPI than bookings?

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Yes. Look, the demand we see over time is driven by an opportunity pipeline. So that is the leading indicator. To me, the most important set of data at this point in time is the opportunity pipeline. That tells us how we’re doing by market segment, by customer in terms of growing the pipeline through all the stages of pre-production. So that will determine ultimately how strong those bookings are over the long term.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Got it. Well, we’re out of time. Thank you, Vincent.

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Thank you, Tim.

Timothy Michael Arcuri - UBS Investment Bank, Research Division - MD and Head of Semiconductors & Semiconductor Equipment

Appreciate it.

Vincent T. Roche - Analog Devices, Inc. - CEO & Chair of the Board of Directors

Good conversation.
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